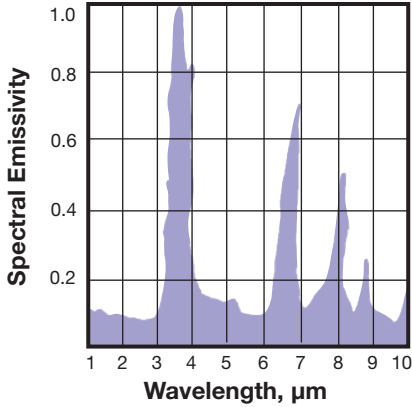


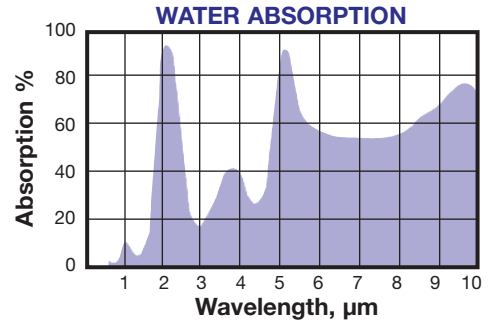


### Medium Wave Infrared E-Mitters

#### SPECTRAL EMISSIVITY OF PET FILM

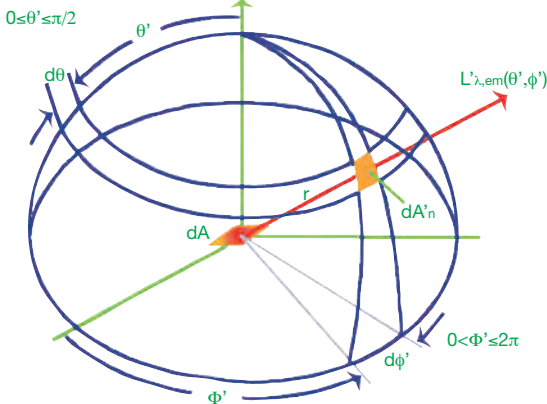


**WAVELENGTH CONTROL** – The very low heat transmission losses through the clear quartz material of the twin bore heaters allow Tempco’s engineers to carefully design the peak emitted wavelength of these heaters to match the peak absorption wavelength for a given material or application. By modifying the temperature of the E-mitter, its peak emitted wavelength will change according to Wien’s displacement law (see page 7-101). All E-mitters will emit a range of wavelengths above and below their peak value. (See spectrum graph on page 7-97.) The design of an efficient infrared heating system must consider both the spectral nature and directional properties of thermal radiation.



**SPECTRAL NATURE:** To address this issue, heaters should be designed to emit wavelengths that closely match the absorption band of the processed material in a given application. By carefully considering the broad side-bands of the emitted radiation and absorption, it is possible to design systems that will enhance the heat transfer rates at different stages of the heating process.

#### Infrared Energy Spectrum Emission



Vaporization of water is best achieved in the infrared spectrum at wavelengths in the range of 3.1 and 6.1  $\mu\text{m}$  (microns). After the water is removed, the infrared heating rate should match the absorption spectrum of the base material to avoid damaging it thermally. Similar approaches are used in many industries, such as automotive, glass and plastic processing, textiles, electronics and many others.

**DIRECTIONAL NATURE:** The directional nature of the heat distribution is dealt with by consideration of how to direct heat toward an application. The efficiency of the heating system depends strongly on the percentage of the total infrared energy generated at the resistance coil that reaches the target material. Consideration must be given to the fact that this infrared energy propagates from the E-mitter in all possible directions with a non-uniform wavelength distribution.

### Design Specifications

Performance Ratings			
Reflective Backing	Gold	White Ceramic	Clear* (no backing)
Maximum Coil Temperature	1472°F (800°C)	2012°F (1100°C)	2012°F (1100°C)
Peak Emitted Wavelength Range (microns)	2.7-6.5	2.1-6.5	2.1-6.5
Radiation Pattern	180°	180°	360°
Nominal Reflected Heat Efficiency	95%	75%	0%

\*Clear tubes are designed for use with external reflector.

Electrical Ratings			
Twin Bore Tube Size	17 × 8 mm	23 × 11 mm	33 × 15 mm
Maximum Power Density (per unit length)	42 w/in (16.5 w/cm)	51 w/in (20 w/cm)	63.5 w/in (25 w/cm)
Maximum Voltage	480V	480V	600V
Maximum Amperage per circuit	9.5A	13.5A	20A

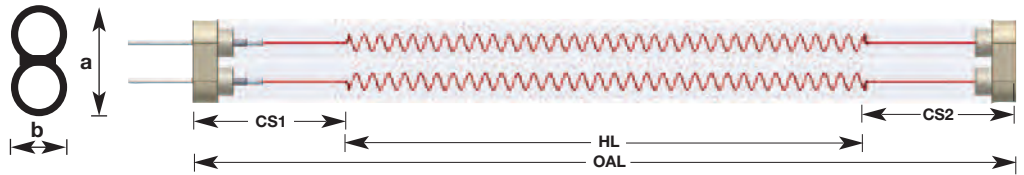
Standard wattage tolerance is +5%, -10%; closer tolerances available upon request



### Medium Wave Infrared E-Mitters

Wire Leads for Standard Configuration are Stranded Lead Wire, Rated 842°F (450°C), 600V.

**OAL:** Overall Length  
**CS1:** Lead End Cold Section  
**HL:** Heated Length  
**CS2:** Blind End Cold Section



#### Dimensional Specifications

Twin Tube Size Dimensions (a x b)	17 x 8 mm (.67 x .31 in)	23 x 11 mm (.91 x .43 in)	33 x 15 mm (1.30 x .59 in)
Maximum Length (OAL)	2000 mm (78.75 in)	2000 mm (78.75 in)	3000 mm (118 in)
Minimum Lead End Cold Length (Standard CS1) (both ends of double end units)	50 mm (1.96 in)	50 mm (1.96 in)	50 mm (1.96 in)
Minimum Blind End Cold Length (Standard CS2) (single ended units only)	50 mm (1.96 in)	50 mm (1.96 in)	50 mm (1.96 in)
Overall Length (OAL) Tolerance		± 2.5 mm (0.10 in)	
Heated Length (HL) Tolerance		±6.5 mm (0.26 in)	

Consult factory for closer tolerances.

### Exceptional Clear Quartz Twin Bore Material with Proven Application Results



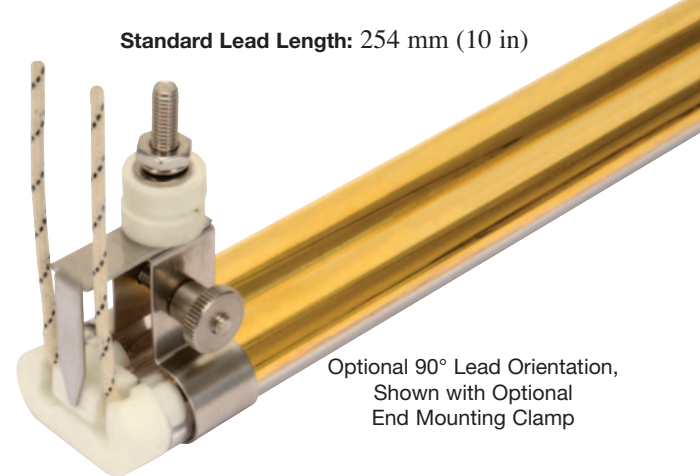
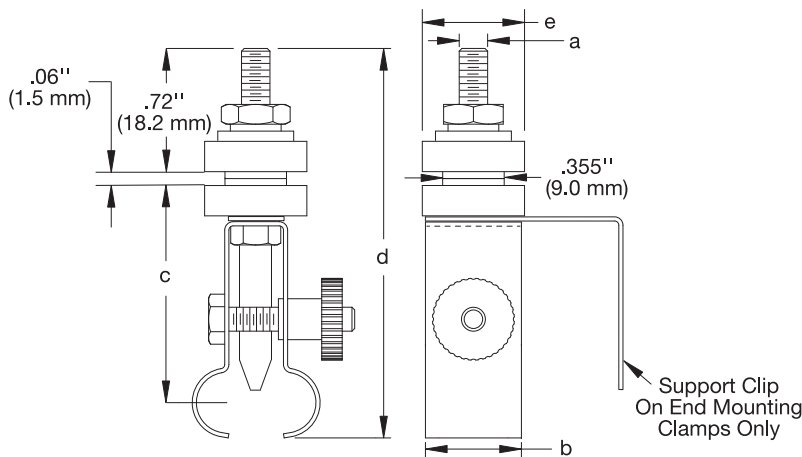
- **Automotive:** Airbag assembly, headliner formation, roof rack bonding, mirror manufacturing, flux powder drying, adhesive activation on protective strips, powder coating, spot repair, friction material bonding, plastic bumper drying, forming & painting
- **Plastics:** PET bottle blow molding, pellet/granulate drying, polypropylene fiber fusing, plastic component extruding/bending, ink drying, and laminating
- **Glass:** Preheating, coating/paint curing, light bulb production
- **Food Industry:** Chocolate processing, cake heating/baking, food warming
- **Paper, Electronics**      ➤ **Metals**      ➤ **Semi-conductor Processing**
- **Textiles,**      ➤ **Furniture**      ➤ **And much more**



### Gemini Medium Wave Infrared E-Mitters

**Lead configurations and lengths** – 842°F (450°C), 600V insulated lead wire, 3/8" stripped ends standard, oriented straight out ends or at 90° to heater axis. Optional styles of high temperature insulated lead wire and un-insulated ring or spade terminals are available to suit your application. Select size and style from charts

on page 7-23. Bare stranded heater leads up to 9" long may be ordered with optional ceramic bead insulators. Longer lengths are available as lead wire options only. When ordering, specify lead orientation, style, length, and terminals.



### Gemini Stainless Steel Clamp Specifications and Dimensions

Clamp Assembly Part Number	CRK00085	CRK00086	CRK00087	CRK00088	CRK00089	CRK00090
<b>Fits Twin Tube Size</b>	17 × 8 mm		23 × 11 mm		33 × 15 mm	
<b>Clamp Location on Tube</b>	Center	End	Center	End	Center	End
<b>Clamps Required</b>	OAL > 39.4" (1000 mm)	2 per heater	OAL > 59.1" (1500 mm)	2 per heater	OAL > 78.7" (2000 mm)	2 per heater
<b>Mounting Stud Threads (a)</b>	10-32		10-32		10-32	
<b>Clamp Width (b)</b>	0.40" (10.2 mm)		0.40" (10.2 mm)		0.60" (15.2 mm)	
<b>Heater Mounting Height (c)</b>	1.20" (30.5 mm)		1.20" (30.5 mm)		1.41" (35.8 mm)	
<b>Overall Clamp Height (d)</b>	2.44" (62 mm)		2.48" (63.1 mm)		2.77" (70.3 mm)	
<b>Ceramic Insulator Diameter (e)</b>	0.59" (15 mm)		0.59" (15 mm)		0.59" (15 mm)	
<b>Panel Mounting Hole Diameter</b>	0.375" (9.5 mm)		0.375" (9.5 mm)		0.375" (9.5 mm)	

Recommended mounting panel thickness range is 18-14 ga.

### Ordering Information

#### Stock Heaters

Order by Tempco Part Number for heaters listed on page 7-66.

#### Custom Engineered/Manufactured Heaters

Because TEMPCO understands that an electric heater can be very application specific, for sizes not listed TEMPCO will design and manufacture a Gemini Infrared Heater or modular housing to meet your requirements. **Standard lead time is 3 weeks.**

#### Please Specify the following:

- Reflective Coating — Gold, White Ceramic or None
- Twin Bore Tube Size (17 × 8 mm, 23 × 11 mm, or 33 × 15 mm)
- Wattage or Watts/In
- Single or Double End
- Overall Length (OAL)
- Heated Length (HL)
- Lead Orientation (0° or 90°)
- Voltage
- Quantity
- Lead Wire Terminals (page 7-23)
- Lead Wire Style/Length (Page 7-23)
- Winding Pattern (page 7-66, A-J or as required)
- Ceramic Bead Option (9" max. length)
- CRA Linear Housing Option (See page 7-68)
- Cold End Lengths (CE1 & CE2) See Winding Pattern page 7-66

**⚠ WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**(800) 323-6859 • Email: [sales@tempco.com](mailto:sales@tempco.com)**